

PATENT SPECIFICATION

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(54) A CUBING MACHINE HAVING A MECHANICAL DEVICE FOR RAPIDLY RELEASING AND LOCKING THE DIE THEREOF

(71) We, LA MECCANICA di Reffo O. & C. s.n.c. of Via Isonzo, Cittadella, Padova, Italy, a societa en nome collettivo organised under the laws of Italy, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be described in and by the following statement:—

The invention provides a cubing machine having a device which enables the die thereof to be rapidly fixed or released i.e. without the use of peripheral bolts which, as for example in cubing machines constructed up to the present time, are gradually tightened in order to fix the die to the machine by precision coupling to a hardened steel ring.

The die may be a die for use in an animal foodstuffs cubing machine.

According to the invention we provide a cubing machine provided with a mechanical device for releasing and locking the die of the cubing machine, comprising a resilient ring having a conical exterior surface and having cuts therein which permit reduction in diameter of the ring, an outer member having an internal conical surface surrounding said ring, a plurality of studs connected to the ring, and springs which can be held in compression by heads on the studs so that the ring can be drawn into said internal conical surface whereby the resilient ring will be reduced in diameter in order to clamp its interior surface on the die, said studs being movable axially thereof for enabling the resilient ring to expand for releasing the die.

The invention will be further described by way of example with reference to the accompanying diagrammatic drawings wherein Figure 1 is a partial section through the rotating head of a cubing machine with the locking device in accordance with the invention; Figure 2 shows the device in accordance with the invention in greater detail; Figure 3 is a partial side view of the resilient ring; and Figure 4 is a front view thereof.

The device according to the invention enables the die *b* (Figure 1) to be rapidly fitted to the rotating head *a* of a cubing

machine. The die *b* is tightly and accurately coupled to the peripheral ring of hardened steel *c* by way of a special resilient ring *d*, as shown in Figures 3 and 4.

In this respect, the ring *d* comprises at regular intervals three transverse deep cuts *e*, it being thus divided resiliently into three adjacent but connected portions.

The coupling between the rings *c* and *d* is conical, as shown in Figures 2 and 3. In this manner, each individual portion of the ring *d* behaves as an actual wedge, and the ring *d* can change its structural diameter because of the cuts *e*.

In order to lock the conical ring *d* to the die *b* or release it therefrom, a number of peripheral steel studs *f* (Figures 1–2), for example twelve, are screwed into the ring parallel to the axis *g* of rotation of the machine, and are surrounded by the cup springs *h*. The studs *f* have nut shaped heads *i*. The springs are in compression between the stud heads *i* and the head *a* whereby the studs are under tension which causes the ring *d* to adhere strongly to the conical surface of the outer hardened ring *c* carried by the head *a*.

This strong conical adherence between *d* and *c* leads to a certain reduction in the diameter of the special resilient ring *d*, and in consequence, the annular die *b* is peripherally locked thereby, and becomes fixed exactly within the ring *d*, also reducing slightly in diameter.

The die *b* is released from the resilient ring *d* by the simultaneous action on all the studs *f* of a steel ring *l* (Figures 1–2) which operates as an annular piston in an analogous circular channel.

The ring *l* comprises on its outer and inner surface a suitable annular seal gasket *m*, which is pressed between two pairs of rings *n–n*, for example of bronze. This is obtained by fixing the flat steel ring *o* into a seat created in the rear face of the rotating head *a*, by means of the bolts *k*.

Thus, by means of this special annular piston *l*, which is displaced to a slight extent axially, for example by means of hydraulic

Figure 1 of the invention.

Figure 2 of the invention.

pressure through the tube *p* (Figure 1), all the studs *f* are made to slide simultaneously (arrow of Figure 2), and the ring *d* is likewise made to slide within the conical surface of *c*, so that
 5 by increasing its diameter it releases the die *b* so that it can be removed from the cubing machine.

To facilitate the separation of the ring *d* from the die, the end *r* of each stud *f* is made
 10 conical, and a bronze core *s* (Figure 2) is fitted into a suitable lateral hole so that, by adjustment by means of the screw *q*, it adheres against said taper *r*.

In this manner, during the required movement of the studs *f* as shown by the arrow, the studs also move laterally to a certain extent because of the taper of *r*, so facilitating separation of the ring *d* from the peripheral ledge on the die *b*, which it is required to
 20 replace.

In addition to the described characteristic of the conical resilient ring *d*, which by the effect of the cup springs *h* acts as a series of wedges between the rotating head *a* and die *b*, there is
 25 also the characteristic of the core device *s* which presses against the taper *r* of the studs in order to displace them radially, so making the locking system original and rapid, without bolts.

30 Constructional modifications can be made to the details of the mechanical device according to the invention, relative to that shown and described, while remaining within the scope of the invention as hereinafter claimed concerning
 35 the conical resilient steel ring with cuts, and the method of its application and operation for locking the die of cubing machines in general and removing it therefrom.

All modifications fall within the scope of the
 40 present invention as defined in the appended

claims.

WHAT WE CLAIM IS:—

1. A cubing machine provided with a mechanical device for releasing and locking the die of the cubing machine, comprising a resilient ring having a conical exterior surface and having
 45 cuts therein which permit reduction in diameter of the ring, an outer member having an internal conical surface surrounding said ring a plurality of studs connected to the ring, and springs
 50 which can be held in compression by heads on the studs so that the ring can be drawn into said internal conical surface whereby the resilient ring will be reduced in diameter in order to
 55 clamp its interior surface on to the die, said studs being movable axially thereof for enabling the resilient ring to expand for releasing the die.

2. A cubing machine as claimed in claim 1, wherein said outer member is an outer
 60 hardened steel ring and an annular piston is provided engageable with the studs for applying pressure thereon so as to release the resilient ring from the outer ring.

3. A cubing machine as claimed in claim 1 or 2, wherein in order to facilitate separation of the resilient ring from the die, each stud joined to the ring comprises a conical portion and an
 65 adjustable pin is provided which engages said conical portion so as to cause the studs to make a small outward displacement radially of the
 70 resilient ring during their axial movement.

4. A cubing machine substantially as described herein with reference to the accompanying drawings.
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COMPLETE SPECIFICATION

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This drawing is a reproduction of the Original on a reduced scale

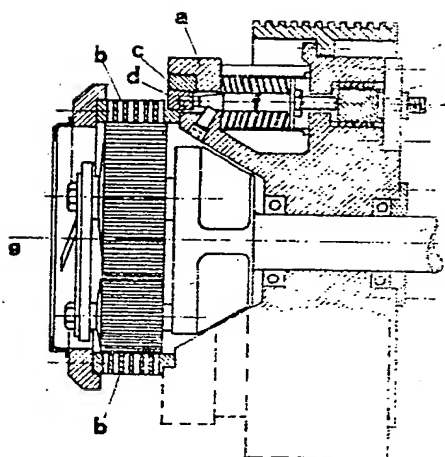


FIG. 1

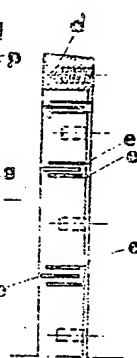


FIG. 2

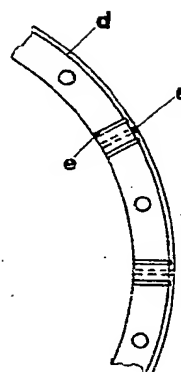
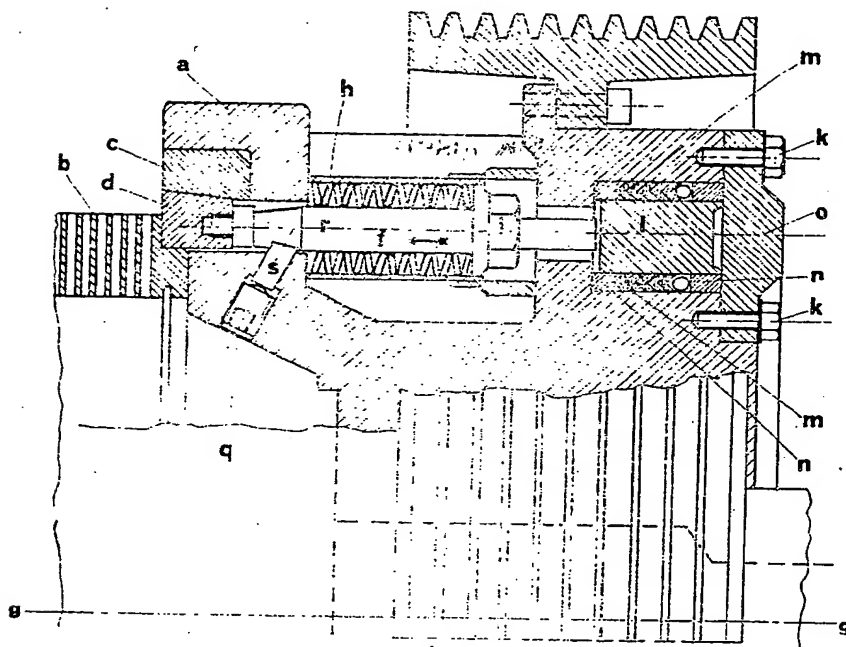


FIG. 4



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